

# THE GENUS BERSAMA.

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THE genus *Bersama* was monographed by Mr. E. G. Baker in 1907 (Journ. Bot., XLV, p. 12), and two species, viz., *B. lucens*, Szyszl., and *B. tysoniana*, Oliv., were described from South Africa. From information received from the Union Forest Department, it was suspected that other species occurred in the South African forests, and, at the suggestion of the Chief of the Division of Botany, I undertook the examination of all the material in the local herbaria. This has led me to separate two plants as distinct species from specimens hitherto always called *B. tysoniana*.

The interest in the various species was first aroused by Mr. C. C. Robertson, M.F., the Senior Research Forest Officer, who sent samples of the bark of *B. tysoniana* to the Imperial Institute for examination, as it was reported that the natives used the bark medicinally. The information supplied by Mr. Robertson to the Imperial Institute did not tally in some respects with the actual samples forwarded, and he took a good deal of trouble to clear up the matter. We are now in a position to state that the information Mr. Robertson received applied to a distinct species which I have named *B. Swinnyi*, while the bark supplied was that of *B. tysoniana*. Dr. T. R. Sim,\* in his description of *B. tysoniana*, falls into the same error, as the tree referred to by Mr. Henkel as having "a very bitter bark, like quinine in taste," is not this species, but quite a distinct plant, which I have named *B. Stayneri*, so his remarks on *B. tysoniana* do not refer to this species alone. Sim suspected the Port St. Johns' plants to be an allied but distinct species, and I have been able to confirm this. It is the plant now named *B. Swinnyi*.

Mr. J. J. Kotze, B.Sc., of the Forest Department, who has given me every assistance in this work, allowed me to go through the files relating to the genus, and, having the actual specimens in the Forestry Herbarium, I was able to clear up some doubtful points. All the correspondence referred to plants which went under the name of *B. tysoniana* and the information was confusing until I was able to definitely recognize that three distinct species were involved. The information derived from the above source I have tabulated under the specific names.

## **B. tysoniana.**

The Conservator of Forests, Transkeian Conservancy, states: "Trees are scattered singly, fairly plentifully over most of the mountain forests and where accessible. It is a prolific seeder, and I am of opinion that it could be easily propagated artificially under mountain forest conditions in its habitat. In collecting the bark, natives do not cut down the whole tree, but merely take their requirements from time to time from living trees. I can confirm the statement: it is a well-known fact that local natives use the bark medicinally." (Stated that native doctors use the bark as a specific against fevers.—(E. P. P.)

\* Sim, "Forest Flora, Cape Colony," p. 175.

A sample of bark was collected by Forester Van de Vijver from the Ngadu Patrol, and he writes: "This bark is used as medicine by some natives, but not all. In cases of calves being thin, they dose the animal with it powdered and mixed with other roots, also lambs." Forester Dawson submitted a sample of bark from the Amanzamnyama Patrol, with the note: "Bark has a slightly bitter taste. I have only seen one tree in my patrol and very few natives know it here. They do not seem to use it themselves, but on their cattle for gall-sickness after boiling bark and dosing from one to two bottles." Forester Fegen collected samples of bark from the Notinsela Patrol, and reported: "Bark has a slightly bitter taste. Natives state that the bark is used as a medicine for hysteria, which is common amongst the native girls. Other natives state that it is used indiscriminately for both cattle and human beings. Judging by the number of trees barked, it must be used more extensively for medicine than natives will admit."

Forester Kriel, who collected the species in the Wilo Forest, Mqanduli District, reports it to be a tree about 25 ft. high with a girth of 42 in.

The tree is locally known as "Bitter Bark" and "Bastard Sneezewood" and by the natives as "Endiaza" or "Andianda."

### B. Swinyi.

Forester Swinyi reports this species to be a tree up to 90 ft. high, with a stem diameter of 2-3 ft., and not common at Port St. Johns. He further states that there appears to be two forms of the species which the natives distinguish, though they have only one name, "Sendiandia." The smaller form, when full grown, has a trunk 1-1½ ft. in diameter.

Mr. Robertson first detected the difference in the barks of this species and *B. tysoniana*, and noted that the bark had "a strong bitter taste producing a sort of burning sensation in the mouth lasting for several hours, during which I could taste nothing else distinctly." He forwarded a sample of the bark to the Imperial Institute in March, 1915. Mr. Ross, then Conservator in the Eastern Conservancy, writes: \* "I distinctly remember this tree being pointed out to me many years ago when stationed at Kokstad as being of value medicinally, an infusion of the bark being extensively used by the natives for certain ailments. It is found somewhat sparingly throughout the mid-Pondoland forests and close to the Natal border in the Mount Ayliff District. It is a very conspicuous object in the forests, of large girth, with deeply furrowed bark, and with foliage not unlike sneezewood. It is usually unsound near the base and shows signs of much damage by removal of bark. This tree is by some foresters confused with 'Coffee Pear' (*Pleurostyliia capensis*), but a keen observer will easily distinguish a great difference."

Forester Pretorius collected samples of bark from the Cwebe Patrol and supplied the following information:—"Bark has a slightly bitter taste (Mr. Robertson remarks 'but burning taste'). The bark of this tree in these parts is very thin and can only be removed in small bits. The natives use it for different medicines, but they refuse to say what it is really used for." Specimens of bark from the Port St. Johns Patrol were received with similar information to the above; in each case Mr. Robertson noted the burning taste, more so in some specimens than in others.

### B. Stayneri.

This species was sent to Mr. Robertson by Forester C. W. Chilvers in June, 1915. Mr. Robertson noted the differences between these specimens and *B. tysoniana* as follows:—

1. Bark has not got the "strong bitter taste" which I referred to in the case of one of the specimens from the Transkei (i.e. *B. Swynni* E.P.P.).
2. Under sides of the leaves and the petioles are very hairy, whereas they are glabrous on specimens received from the Transkei.
3. The specimens were in flower when collected in May. Sim states that this species † flowers in August to September.

\* It is just possible that some of Mr. Ross's remarks may apply to *B. tysoniana*.

† Mr. Robertson, although he noted these differences, still considered the plant *B. tysoniana*.

Mr. C. F. Stayner, in a minute to the Conservator of Forests, Pietermaritzburg, states : " One large tree isolated by heavy fellings was in flower as late as September, and I have come to the conclusion that this species (but he confused his specimen with *B. tysoniana* E.P.P.) is inconsistent in its period of blossoming. I find that *Bersama* is well known to native herbalists and is frequently employed, but for what disease it is a specific I cannot ascertain." Mr. Stayner submitted his specimen to the Bolus Herbarium, and these were reported on as follows :—" Very nearly allied to *B. tysoniana*, Oliv., and probably that species, but the type of *B. tysoniana* has more slender, longer, and less tomentose petioles."

Mr. J. S. Henkel, who also collected the species at Mkazeni Forest Reserve, Riverside, Natal, in March, 1917, states " that the tree is about 30 ft. high—a bole about 70 in. in girth and 12 ft. long, somewhat crooked. Natives use the bark as medicine and the tree has been injured by the removal of bark. Bark has a bitter quinine-like taste." Mr. Henkel also noted that the leaves were hairy, and not glabrous. Forester Honshold informs Mr. Henkel that in the reserve there are about three to four other trees, all smaller than the one he saw. In the bush many seedlings were noticed up to about 4 ft. high. The young shoots are frequently reddish in colour and leaves serrated and mucronulate, but older leaves have margins entire.

Mr. Robertson took considerable pains to sift all the evidence he had accumulated, and tabulated his results \* as follows :—

Mr. Robertson distinguished the various samples of bark he examined as (1) those with a bitter taste and (2) those with a bitter *and burning* taste. This latter property he referred to as " X."

Forest.	Large or Small Variety.	Sample of Bark.	Taste.	Remarks.
MOUNTAIN FORESTS.				
Kambi.....	Presumably the large variety	Sent June, 1914, and February, 1915	Not X.....	<i>B.tysoniana</i> , sent to Imperial Institute.
Nqadu.....	Large.....	Collected March, 1915..	Not X.....	<i>B. tysoniana</i> .†
Amanzamnyama.	Large.....	Collected March, 1915..	Not X.....	<i>B. tysoniana</i> .
COAST FORESTS.				
Port St. Johns..	Large.....	Sent July, 1914.....	Has X.....	<i>B. Swinnyi</i> .
Bulolo Forest...	Large.....	Collected March, 1915..	Has X, though not strongly	<i>B. Swinnyi</i> .
Mboleni Forest..	Large.....	Collected March, 1915..	Not X.....	<i>B. tysoniana</i> .
Cwebe Forest...	Large.....	Collected March, 1915..	Has X, though not strongly	<i>B. Swinnyi</i> .
Cwebe Forest...	Small.....	Collected March, 1915..	Has X, though not strongly	<i>B. Swinnyi</i> .
Port St. Johns..	Small.....	Sent July, 1914.....	Has X.....	<i>B. Swinnyi</i> .
Bulolo Forest...	Small.....	Collected March, 1915..	Has X.....	<i>B. Swinnyi</i> .†

Mr. Robertson came to the following conclusions :—

1. In mountain forests the large variety (i.e. *B. tysoniana* E.P.P.) has not " X." Yet the natives do use the bark in these forests, so that its medicinal qualities do not depend on its having " X." It appears that only the large variety is found in the mountain forests.

\* In the "Remarks" column I have inserted the name of the species which was given in the original by a herbarium number only.

† I have not seen specimens of these, but do not doubt the correctness of the names given.—(E. P. P.)

2. In the coast forests the large variety \* usually has "X" to a greater or less extent, but apparently not so strongly as the small variety (*B. Swinnyi* *E.P.P.*). The latter always has it and usually very strong.

The results of my investigation may be summarized as follows:—

1. Foresters had hitherto only recognized two species, viz., *B. lucens* and *B. tysoniana*.
2. Under the name of *B. tysoniana*, three species have been included—
  - (a) *B. tysoniana*, found in both the mountain and coast forests.
  - (b) *B. Swinnyi*, found only in the coast forests.
  - (c) *B. Stayneri*, only recorded from Natal.
3. The bark of *B. tysoniana*, *B. Swinnyi*, and *B. Stayneri* is used medicinally by the natives.
4. The bark of *B. Swinnyi* has a bitter burning taste and differs in this respect from that of *B. tysoniana* and *B. Stayneri*, in which the bark, while bitter, has not the burning taste.
5. There appear to be two forms of *B. Swinnyi* in the forest of Port St. Johns, known to the foresters as the large and small varieties. The natives are said also to distinguish these, but have the same name for both.

I have been unable to furnish any additional information with regard to the other species recorded.

In conclusion I should like to refer again to Mr. C. C. Robertson's share of this work. Since 1914 he has been slowly accumulating evidence from foresters about the species, and my remarks are only a digest of the information he collected.

With the assistance of the Forest Department, the Division of Botany is undertaking an examination of the barks of the various species as regards their medicinal value.

#### KEY TO SPECIES.

Inflorescence quite sessile, ovoid or globose, surrounded at the base by numerous large ovate acuminate silky bracts.....	<i>Swinnyi.</i>
Inflorescence distinctly peduncled, rarely sub-sessile, but then bracts at the base never densely silky.	
Mid-rib on lower surface of leaflets covered with long straight hairs.	<i>Stayneri.</i>
Mid-rib on lower surface of leaflets glabrous.	
Fruits without woody protuberances; inflorescence silky or tomentose with fine adpressed hairs.	
Leaves usually 2-3-jugate; leaflets obovate, usually rounded at the apex, obtuse.....	<i>lucens.</i>
Leaves usually 4-jugate; leaflet oblong-lanceolate, acuminate, acute.....	<i>abyssinica.</i>
Fruits with woody protuberances; inflorescence tomentose with spreading hairs appearing almost shaggy.....	<i>tysoniana.</i>

#### 1. *B. Swinnyi*, Phillips.

Arbor. *Rami* glabri vel juniores serici. *Folia* 10-20 cm. longa, pinnata, 5-jugata; foliola 2-8 cm. longa, 0.9-3.5 cm. lata, oblongo-lanceolata, ovato-oblonga vel ovata, apice obtusa, glabra. *Racemus* sessilis, 2.5-5 cm. longus, circa 3 cm. latus, subgloboseus vel ovatus. *Bractea*e numerosae, 2 cm. longae, ovatae, acuminatae, sericae.

A large or small tree, with rough bark. *Branches* glabrous or in very young branches velvety. *Leaves* 10-20 cm. long, grouped at the ends of the branches, petiolate, pinnately compound, 5-jugate; petiole 2.5-3.5 cm. long, pubescent in young leaves, glabrous in older leaves; leaflets petiolulate, 2-8 cm. long, 0.9-3.5 cm. broad, oblong-lanceolate or ovate-oblong, or ovate, obtuse or slightly retuse at the apex, rounded at the base, with

\* Mr. Robertson here confuses *B. tysoniana* and *B. Swinnyi*, both of which occur in the coast forests.—(*E. P. P.*)

the mid-rib prominent beneath and the lateral veins distinct, glabrous. *Inflorescence* sessile, 2.5–5 cm. long, about 3 cm. in diameter, subglobose or ovoid in shape, surrounded at the base with numerous ovate acuminate densely silky bracts about 2 cm. long. *Floral-bract* 7 mm. long, ovate, acuminate, very densely silky. *Pedicel* about 4 cm. long, terete, silky. *Sepals* 6 mm. long, ovate, acute, distinctly keeled, silky. *Petals* 1.3 cm. long, about 3 mm. broad at the middle, spatulate-linear, tomentose without, sometimes with two marginal processes at the middle. *Stamens* monadelphous; filaments terete and narrowing above, flattened below and hairy on the flattened portion. *Ovary* 1.5 mm. long, sub-globose, villous; style 1.3 cm. long, terete and densely villous in the lower  $\frac{3}{4}$  becoming more or less four-angled and glabrous above; stigma globose. *Fruit* not seen.

*Pondoland*: In monte propoxe ostium flum St. Johns R., c. 1000 ft., February, *Bolus* 8724; 20 ft., January, *Flanagan* 2884; Port St. Johns, *Swinny in Herb. Forest Dept.*, 1038, 1037; Pongwani Forest, Port St. Johns, January, *Coetzee in Herb. Forest Dept.*, 1866.

## 2. *B. Stayneri* Phillips.

*Rami* glabri. *Folia* pinnata, 7–16 cm. longa, 4–5-jugata; petiolus pilosus; folioal 1.7–5.2 cm. longa, 0.8–1.5 cm. lata, oblongo-lanceolata vel elliptica, apice acuta mucronataque, basi paulo cuneata, subtus pilosa vel pubescentia. *Racemus* 3.5–6.5 cm. longus. *Fructus* 2.7–3 cm. longus, ligneus.

Bark thick and rough. *Branches* glabrous, rough with longitudinal furrows. *Leaves* pinnate, petioled, 7–16 cm. long, 4–5-jugate; petiole 1–2 cm. long, very densely pilose; rachis densely pilose; leaflets 1.7–5.2 cm. long, 0.8–1.5 cm. broad, oblong-lanceolate or elliptic, acute and mucronate at the apex rarely rounded, slightly cuneate at the base, the mid-rib deeply sunk on the under surface which is frequently somewhat rugose, prominent beneath and with the lateral veins distinct beneath, glabrous above, pilose or pubescent beneath, especially on the mid-rib. *Inflorescence* a shortly peduncled many-flowered raceme, 3.5–6.5 cm. long; peduncle 1–1.5 cm. long, very densely pilose. *Bracts* 3 mm. long, linear, tomentose, *Pedicels* 5 mm. long, terete, tomentose. *Calyx* 6 mm. long, densely tomentose, divided almost to the base. *Petals* 1.3 cm. long, 3 mm. broad, spatulate-linear, tomentose, reflexed in open flowers. *Filaments* 5 mm. long, semiterete, monadelphous and villous at the base. *Ovary* densely villous; style 3 mm. long, terete; stigma subglobose. *Fruit* 2.7–3 cm. long dehiscent by four valves; valves woody, covered with woody protuberances. *Seeds* reddish in colour, 1.1 cm. long, 6 mm. in diameter, ellipsoid, with a waxy yellow arillus at the base.

Natal, without locality, *Stayner in Herb. Bolus*; Stinkwood Forest, Ingeli, May, *Chilvers in Herb. Forest Dept.*, 1518; Mkanzeni, Riversides, *Henkel in Herb. Forest Dept.*, 2421.

## 3. *B. lucens* Szysz.

A shrub 8–10 ft. high (ex *Wood*). *Branches* glabrous, with wrinkled greyish bark. *Leaves* petioled, compound, imparipinnate, 2–4-jugate, 10–20 cm. long; petiole 1.5–5.5 cm. long, glabrous, rarely pubescent; leaflets 1.8–9 cm. long, 1.3–4.6 cm. broad, obovate or obovate-elliptic, rarely elliptic, very rarely subacute, slightly narrowed at the base, glabrous, with the mid-rib distinct above, prominent beneath, and with thickened wavy margins. *Inflorescence* a lax axillary or terminal raceme, 6–14.5 cm. long, many-flowered; peduncle pubescent. *Pedicels* 0.4–1 cm. long, terete, densely tomentose with fine adpressed hairs; bracts 0.5 mm. long, ovate, pubescent. *Calyx* gamosepalous; lobes 3–4 mm. long, 2 mm. broad, ovate or ovate-elliptic, obtuse, finely but densely pubescent without and with fine adpressed hairs within, ciliated, the two posterior lobes connate and bifid at the apex. *Petals* dull yellow, 8.5 mm. long, 2.5 mm. broad above, oblong, obtuse, narrowed into an evident claw, pubescent. *Disc* unilateral. *Filaments* all connate at the base, 1 mm. long, terete, glabrous except at the base, the anterior filaments ciliated at the base and forming a tomentose shield 3 mm. long and 2.5 mm. broad; the posterior filaments

ciliated and pubescent at the base; anthers 2.5 mm. long, 1.5 mm. broad, oblong. *Ovary* 1 mm. long, 1.5 mm. broad, subglobose, densely villous, four-locular with a single ovule in each loculus; style 7 mm. long, cylindric, pubescent on the lower half; stigma globose, faintly lobed. *Fruit* 1.7 cm. long, 1.7 cm. in diameter, finely but densely pubescent, four-celled, each cell with a single seed, splitting into four valves when ripe. *Seeds* bright scarlet, 7 mm. long, 7 mm. in diameter, subglobose, wrinkled, flat on one side, convex on the other, with a fleshy yellow-green arillus. *Wood*, *Natal Plants*, 88; *Sim*, *Forests and Forest Flora*, 155; *Journ. Bot.*, XLV, p. 13. *Natalia lucens*, *Hochst., Harv. and Sond., Fl. Cap.*, 1, 369.

Komgha Div., Kei Mouth, 200 ft., August, *Flanagan*, 421; Transkei, Kentani, 20 ft., December, *Miss Pegler*, 726; Pondoland, mouth of St. Johns River, *February*, *Bolus*, 8836; *Flanagan*, 2568; 20 ft., January, Manino Forest, Engcobo Dist., August (leaf only). *Zahn in Herb., Forest Dept.*, 2046; *Natal*, near Durban, 200 ft., February, *Wood*, 7392; March, *Wood*, 7518; Verulam, 100–200 ft., January, *Wood*, 10207; near Durban, *Wood*, 2570; 12666; Port Natal, *Gueinzuis*; Groenberg, February, *Wood*, 808; without precise locality, *Saunders*; near, Durban, 200–300 ft., March, *Wood*, 6307; Swaziland, kloof near Dalriach Mbabane, c. 4800 ft., December, *Bolus*; *Transvaal*, Barberton Dist., Unevoti Creek, Barberton, 3000 ft., February, *Galpin*, 849; *Thorncroft in Herb. Transvaal Mus.*, 18292.

*Flanagan*, 421, mentioned by Baker as a form with smaller leaflets than the type is slightly confusing, inasmuch as *Flanagan* gave the same number to two different collectings. His No. 421 in the *Bolus Herb.* was collected at the Kei Mouth at an altitude of 200 ft. in August, 1894, and is the true *B. lucens*. His No. 421 in the Cape Government Herb. was also collected near the Kei Mouth at an altitude of 300 ft., but in January, 1890. The inflorescence in these specimens is compact, oblong in outline, and at the end of a long naked peduncle 9–12 cm. long. The peduncle is fasciated to a slight extent, which will account for the compact inflorescence. There is no difference in the floral structures of these specimens and other specimens of *B. lucens* which I have examined.

#### 4. *B. abyssinica* Fresen.

A tree. *Leaves* petioled, 18–22 cm. long, pinnate; petiole 4–5 cm. long, terete, glabrous; rachis sometimes winged between the uppermost pair of leaflets; leaflets usually in four pairs, 2.5–4 cm. apart, 4–9 cm. long, 1.7–3.5 cm. broad, oblong-lanceolate or ovate-lanceolate, acuminate, acute, entire, or the margin sometimes serrated in the upper half, glabrous. *Inflorescence* racemose, 10–20 cm. long, on a woody peduncle 5–7 cm. long. *Calyx* campanulate, silky. *Petals* five, ligulate-spathulate, twice as long as the calyx, densely and finely silky, finally reflexed. *Stamens* five, in the male flower nearly as long as the petals; filaments monadelphous, silky. *Capsule* about 1 cm. long, 1 cm. in diameter, subglobose 3–4 valved, densely pubescent, without woody protuberances. *Seeds* 6 mm. long, black.

This description was drawn up partly from a fruiting specimen collected by Schimper in Abyssinia and partly from the description in the "Flora Tropical Africa."

Baker, in his monograph on the genus (*Journ. Bot.*, XLV, 12), makes no mention of this species occurring in Natal, though the record is made in the "Flora Tropical Africa," I, 434.

= *B. integrifolia*, Richard, *Fl. Abyss.*, I, 107. This is a tropical African species.

#### 5. *B. tysoniana* Oliv.

A tree 25 ft. high, with a girth of 42 in. (Krid). *Branches* glabrous. *Leaves* petioled, pinnately compound, 4–5-jugate, rarely 3-jugate, 5–20 cm. long; petiole 2–5 cm. long, subtomentose, pubescent to almost glabrous, sometimes white silky; leaflets 1.5–6 cm. long, 0.7–3 cm. broad, oblanceolate, oblong, oblong-elliptic, rarely obovate, rounded or shortly apiculate at the apex, cuneate more rarely rounded at the base, entire, rarely serrated in the upper half, with the mid-rib prominent beneath, glabrous. *Inflorescence* a